

Vulnerability and Resilience in Flagstaff

September 28, 2021

Project Goals

1.Expand on adaptation methods outlined in the Carbon Neutrality Plan.

2. Consolidate information provided in relevant City documents.

3. Facilitate conversations with the Flagstaff community and obtain their feedback.

4.Provide recommendations to the City in a Resilience Resource Document.

Flagstaff Climate Documents

- 2012 Resilience and Preparedness Study
- 2018 City of Flagstaff Climate Profile
- 2018 Flagstaff Vulnerability Assessment
- 2018 Climate Action & Adaptation Plan
- 2020 Council Declares Climate Emergency
- 2021 Carbon Neutrality Plan

Definitions

Resilience:

- A community's ability to thrive when change occurs
- Involves anticipation and preparation for changing conditions

Vulnerability:

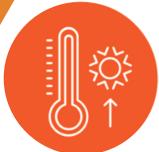
• The potential to be harmed

Adaptation:

 Actions that increase the ability to withstand, respond, or cope with climate change impacts

CLIMATE CHANGE IN FLAGSTAFF

Compared to today, by 2050 we expect to have, on average...



- Hotter temperatures.
- Increased risk of disease or illness from mosquitoes and other pests.



- Less snowpack.
- Precipitation shifts from snowfall to rainfall



- Increased high-severity wildfire risk.
- Increased damage from forest pests due to drought-stressed trees.



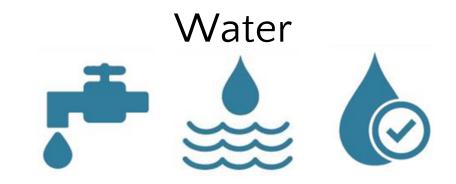
- More severe **drought** conditions as temperatures rise.
- Lower water quality of reservoirs.

Vulnerabilities: What is at risk?

Tourism & Economy







Land Use & Housing





Climate change poses risks to everything from our **health** and **infrastructure** to local **ecosystems**.

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Tourism & Recreation

WINTER TOURISM

SUMMER TOURISM

HIGH VULNERABILITY





Significant snowpack loss will decrease winter recreation and tourism.



More wildfire, drought, or extreme heat may temporarily reduce visitation in summer, spring, and fall.

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Water Supply, Quality, & Infrastructure

AVAILABILITY

HIGH VULNERABILITY



MEDIUM-HIGH VULNERABILITY



HIGH VULNERABILITY



Reduced water availability and increased demand could cause water shortfalls.



More wildfire, drought, and flooding are likely to impair water quality.



More wildfire and flooding are likely to significantly damage natural and humanmade water infrastructure.

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Water Supply, Quality, & Infrastructure



Example of severe flooding due to extreme rainfall event.

(2021 Steve's Boulevard, CNN.com)

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Forest Health & Wildlife

FOREST HEALTH

VERY HIGH VULNERABILITY

WILDFIRE

HIGH VULNERABILITY

FLOODING

MEDIUM-HIGH VULNERABILITY

INSECTS & PESTS

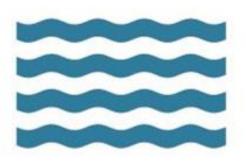
HIGH VULNERABILITY



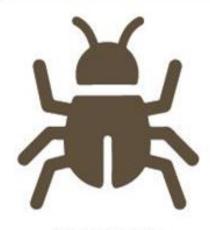
Overall declines in forest health and widespread forest loss due to wildfires, drought, pests, and invasive species.



Larger, more frequent stand-replacing wildfires.



Larger, more frequent flooding after wildfires. More floods in general.



More beetle infestations and invasive species due to warmer, drier conditions.

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Forest Health & Wildlife



Museum Fire of 2019

(ktar.com)

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Land Use, Infrastructure, & Housing

OPEN SPACE

MEDIUM-HIGH VULNERABILITY



Wildfires and hotter, drier conditions may make healthy open space more difficult to sustain. **LAND USE**

LOW-MEDIUM VULNERABILITY



Greater population

density is planned away
from wildfire- and floodprone areas, with more
city parks and open
space to provide shade.

INFRASTRUCTURE

MEDIUM VULNERABILITY



Hotter temperatures may stress buildings, utilities, and roads. RESIDENTIAL ENERGY USE

MEDIUM VULNERABILITY



may increase energy costs and make summer cooling out of reach for many households.

CLIMATE CHANGE IN FLAGSTAFF Vulnerabilities: Public Health, Safety, & Services

AIR QUALITY

MEDIUM VULNERABILITY



More periods of **poor air quality** due to larger, more frequent wildfires.

HEAT-RELATED ILLNESSES

MEDIUM VULNERABILITY



More extreme heat days (>90°F) could increase the risk of **heat-related**

ALLERGEN EXPOSURE

LOW VULNERABILITY



Increased **exposure to allergens** is possible as spring grows warmer and more dry weather increases dust.

MENTAL HEALTH

LOW-MEDIUM VULNERABILITY



More frequent extreme events could increasethe risk of mental health issues.

INFECTIOUS DISEASES

LOW-MEDIUM VULNERABILITY



Increased exposure to valley fever and West Nile virus is possible as the warm season lengthens. Existing response resources may be adequate.

Tying It All Together

Flagstaff's Carbon Neutrality Plan Goal #2: Prepare the City's communities, systems, and resources to be more resilient to climate change impacts.

Plan of Action: Furthering Flagstaff's discussion on adaptation and resilience, through conversations with the community and City Council

- Present to the Sustainability
 Commission
 Thu 9/23
 - Present to City Council
 Tue 9/28
 - Present to Commission on Diversity Awareness
 Tue 10/19

- Present to Commission on Inclusion and Adaptive Living Tue 10/26
 - Open Forum(community feedback)Oct (TBD)
- Final Presentation to City
 Council
 Tue 11/30

Thank you.
We welcome
your feedback.

Contact us:

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